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Research Article

The impact of grandparental investment on mothers' fertility intentions in four European countries

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Abstract

BACKGROUND
Evolutionary theory predicts that grandparental investment should support the childbearing of adult children, but evidence from contemporary developed countries is mixed or relatively weak. One possible reason for this lack of clarity is that grandparental support for fertility may vary by country, the economic situation of the adult child's household, and the lineage and the sex of the grandparent.

OBJECTIVE
We investigate the associations between grandparental investments and the intentions of mothers to have a second or third child in four European countries – Bulgaria, France, Lithuania, and Norway – while paying special attention to effect of the country, the financial security of the household, and the different grandparent types.

METHODS
Using the first wave data (2004–08) of the Generations and Gender Surveys, we measured grandparental investment by the amount of child care help and emotional support mothers reported receiving from their parents. We studied these factors with binary logistic regression analysis.

RESULTS
Both emotional support and child care help from grandparents were associated with increased fertility intentions in France and Norway. Emotional support was also associated with increased fertility intentions in Bulgaria, while grandparental child care help was associated with decreased intentions in Lithuania. Emotional support was more strongly associated with fertility intentions in financially secure households. Emotional support received from a maternal grandmother, a maternal grandfather, and a

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paternal grandmother; and child care help received from a maternal grandfather; were associated with an increased probability that a mother would report the intention to have another child.

CONCLUSIONS
Grandparental investment, especially emotional support, appears to be most influential in wealthier European countries and among more financially secure families. When a family's socioeconomic situation and the broader environment are generally favourable for having several children, grandparents may provide the "extra push" that supports the intention to have another child.

1. Introduction

Research has shown that, due to demographic changes, especially increased life expectancy and the challenges of combining wage work and parenting, grandparental investment in children and grandchildren has become increasingly important in modern, western societies (Coall and Hertwig 2010; 2011). However, the question of whether grandparents also contribute to higher fertility has been harder to answer, as the existing empirical evidence has been mixed. Grandparental child care help has been found to be correlated with an increased probability that parents will have another child in the Netherlands (Kaptijn et al. 2010; Thomese and Liefbroer 2013), and one study has detected a positive association between grandparental child care help and childbearing in several European countries if the grandchildren were not very young (Aassve, Meroni, and Pronzato 2012). By contrast, Waynforth (2011) found no association between grandparental child care and parents' fertility in the UK, although the closeness of the parents to their own parents was shown to be associated with an increased likelihood of having another child.

The possible positive effect of grandparental help is thus relatively weak, and can be expected to vary by country and parity, as well as by the type and the availability of grandparental investment. In addition, grandparental effect may vary by grandparental lineage. In a recent study, Tanskanen, Jokela, Danielsbacka, and Rotkirch (2014) found that parents who had contact with the paternal grandparents of their first child were more likely to have a second child, while parents who had contact with the maternal grandmother of their first two children were less likely to have a third or subsequent child.

The present study uses the first wave of the Generations and Gender Surveys (GGS) to investigate the association between grandparental investment and the fertility

intentions of mothers in four European countries: France, Norway, Bulgaria, and Lithuania. We study these countries because we are interested in exploring the question of how different fertility and family policy regimes are associated with the effects of grandparental investment on fertility. We have chosen to study possible grandparental effects because kin tend to have a greater impact than non-kin on fertility decisions (see Newson et al. 2005 for discussion), and grandparents may be the kin who have the greatest impact on fertility decisions (Sear and Coall 2011).

Fertility intentions are a good indicator of actual childbearing behaviour, but they are not equivalent to it (Philipov 2009). There is a decreased likelihood that couples will realise their fertility intentions with, for example, advancing female age (Berrington 2004), higher parity (Regnier-Loilier and Vignoli 2011), and an increase in financial insecurity (Testa and Toulemon 2006). In addition, many couples today would like to have another child at some point in their lives, but do not intend to have a child in the foreseeable future (Buchanan and Rotkirch 2013; Testa 2012). In order to explore the impact of grandparenting on fertility, it is therefore of interest to take into account not only actual childbearing behaviour, but also childbearing plans and intentions. To our knowledge, this has not been done previously.

2. Theoretical framework

2.1 Inclusive fitness and grandparental investment

Evolutionary inclusive fitness theory (Hamilton 1964) predicts that in species with cooperative breeding such as humans, grandparental investment may influence the fertility decisions of mothers. This possible grandparental effect can be expected to vary with the ecological and the socioeconomic circumstances of the family, and also with the sex and the lineage of the grandparents. Based on Hamilton's rule, inclusive fitness can be increased through the individual's own reproduction or by supporting reproduction among genetically closely related kin (Coall et al. 2009).

In line with inclusive fitness theory, grandparental presence has been found to increase the likelihood of parents having another child in many traditional and high-fertility populations (e.g., Lahdenperä et al. 2004; Sear, Mace, and McGregor 2003; see Mace and Sear 2005; Sear and Coall 2011 for reviews). As we discussed above, studies from modern, low-fertility societies have also found some associations between grandparental investment and childbearing, but they have generally been weak.

In studying grandparental effects, it is important to recall that not all grandparents are the same (Euler 2011). First, grandparental investment may vary by the lineage of the grandparent (Euler and Weitzel 1996; Smith 1987). In general, maternal

grandparents tend to invest more in their grandchildren than paternal grandparents. If we assume that maternal grandparents tend to be more effective helpers, we can also assume that having support from her parents would boost a mother's intention to have another child more than having the same amount of support from the parents of the father of her first child.

Investment also seems to vary by the sex of the grandparent, as grandmothers have been found to invest more than grandfathers once the effect of lineage is taken into account (e.g., Danielsbacka et al. 2011; Pashos and McBurney 2008; Pollet, Nettle, and Nelissen 2006; 2007; Tanskanen, Rotkirch, and Danielsbacka 2011). Grandmothers appear to have played a crucial role in childrearing in our evolutionary past (Lahdenperä et al. 2004; Mace and Sear 2005), and also in modern societies (Coall and Hertwig 2010). The role of grandfathers in fertility behaviour and child survival in pre-modern populations is much more debatable (Lahdenperä, Russell, and Lummaa 2007). But with increasing gender equality and male participation in child care, both grandmothers and grandfathers can be expected to contribute to the well-being of the families of their grandchildren. This has been confirmed in studies which have shown that in some situations grandfathers may have the same or an even greater degree of influence as grandmothers on the well-being of their grandchildren (e.g., Oyserman, Radin, and Benn 1993). Based on their review of 15 studies, Sear and Coall (2011) found that in modern, low-fertility societies, the presence of the maternal grandfather was more often associated with increased fertility among adult daughters than the presence of the maternal grandmother.

2.2 Grandparental child care help and emotional support

There are two basic ways in which grandparents may influence women's fertility decisions: the grandparents can provide daughters and daughters-in-law with practical and material resources (e.g., help with child care), or they can provide them with other forms of assistance (e.g., emotional support) (Mathews and Sear 2013). Child care is an investment of time, care, and resources in a grandchild (Euler and Michalski 2008; Tanskanen, Danielsbacka, and Rotkirch 2014) which may have benefits for grandparents, parents, and children. Thus, caring for their grandchildren may positively influence the health of the grandparents (Hughes et al. 2007), and grandparents who look after their grandchildren may receive more support from their offspring in the future (Geurts, Poortman, and van Tilburg 2012). From the parents' point of view, grandparental child care help enables them to better combine paid work and family life (Hoppmann and Klumb 2010), facilitates the labour force participation of the female partner (Wheelock and Jones 2002), and increases the probability of having another

child (Kaptijn et al. 2010). Grandparental support may also influence grandchild outcomes (Tanskanen and Danielsbacka 2012; Tanskanen 2013).

In addition, grandparental child care help can reduce the cost of reproduction for mothers, which could be especially important in countries where publicly provided childcare arrangements are inadequate (Aassve et al. 2012; Hank and Buber 2009). Child care policies vary substantially across Europe. In France, Norway, Bulgaria, and Lithuania, the countries studied here, public child care provision and private child care arrangements are organised differently (Saraceno and Keck 2011). Public spending on family benefits as a percentage of GDP is well above the OECD average in France and Norway, and is clearly below the OECD average in Bulgaria and Lithuania (OECD 2010). The coverage of publicly provided child care services is also broader in France and Norway than in Bulgaria and Lithuania (Saraceno 2011). Moreover, France and Norway are much wealthier than Bulgaria and Lithuania (Eurostat, 2013).

In addition to providing child care, grandparents frequently offer their adult children emotional support (Coall and Hertwig 2010). This support may signal to a woman that it is both feasible and desirable to have an additional family member (Sear and Dickins 2010). In modern, resource-rich countries, emotional support received from grandparents could have a greater influence on fertility decisions than practical assistance with child care (Waynforth 2011).

While child care help and emotional support are different types of investments, they are not separate. The provision of child care often overlaps with emotional support, as grandparents often take care of their grandchildren while interacting with their adult children. In addition, grandparents who offer emotional support may signal to the parents that they are willing to provide child care or other forms of help as needed, such as financial assistance. In this case, the involvement of grandparents may represent a kind of "insurance" for parents concerned about whether they have sufficient resources to support their children. Thus, we expect to find that mothers who receive emotional or child care support from their parents will be more likely to plan to have another child.

2.3 Factors influencing fertility intentions

Many factors influence women's childbearing intentions. Younger mothers are more likely than older mothers to say they intend to have additional children (e.g., Philipov, Speder, and Billari 2006). Mothers who have only one child are more likely to report that they intend to have another child than mothers who have already at least two children (Balbo and Mills 2011; Buhler and Fratczak 2007), and the age of the youngest child is correlated with maternal childbearing intentions (Balbo and Mills 2011). In contemporary Europe, women with higher levels of education are more likely to say

they intend to have another child than women with lower levels of education, partly due to the effect of postponement among the highly educated. Studies have also shown that, on average, religious women plan to have more children than non-religious women (Miettinen, Basten, and Rotkirch 2011; Billari, Philipov, and Testa 2009). In addition, financial security appears to influence the intention to have a child: mothers in higher income households intend to have more likely another child than mothers from lower income households (see Philipov et al. 2006).

Obviously, the presence of a partner influences childbearing intentions (e.g., Miettinen 2010), as do partner characteristics. For example, a mother with a highly educated partner is more likely to say she intends to have another child than a mother with a less educated partner (Balbo and Mills 2011; Buhler and Fratczak 2007). The age and employment status of the partner may also affect maternal fertility intentions (Buhler and Fratczak 2007; but see Balbo and Mills 2011).

Country-specific fertility rates may be associated with the intentions of mothers to have another child (Balbo and Mills 2011). European fertility rates range from very low to close to replacement level. During the GGS data collection in the four countries analysed in this study, the highest fertility rates were found in France and Norway (over 1.9 children per woman), while the fertility rates in Bulgaria and Lithuania were very low (about 1.3 children per woman) (PRB 2012). France and Norway are also wealthier countries than Bulgaria and Lithuania, and spend proportionally more on family services and benefits (OECD 2010). We are here interested in possible country differences between wealthier, higher fertility countries with more generous family policy expenditures (France and Norway) compared to the less wealthy, lower fertility countries with smaller family policy expenditures (Bulgaria and Lithuania). Finally, we assume that as wealth at the family level shapes fertility intentions, support provided by grandparents may have different effects in different socioeconomic groups.

3. Objective

This study explores the associations between grandparental investment, measured as child care and emotional support, and the intentions of mothers to have a second or third child in four European countries. We investigate four questions: Does grandparental investment correlate with mothers' childbearing intentions (Q1)? How do these potential correlations vary by country (Q2) and by the socioeconomic situation of a mother's family (Q3)? How are the lineage and the sex of the grandparents related to the associations between grandparental investment and the fertility intentions of mothers (Q4)?

4. Materials and methods

Our data are from the first wave of the Generation and Gender Surveys (GGS) from France (collected in 2005), Norway (2007–2008), Bulgaria (2004), and Lithuania (2006). The GGS is a large-scale, cross-national, and nationally representative survey of individuals aged 18–79. The aim of the project is to gather longitudinal data on intergenerational and gender relations from both European and non-European countries (see Vikat et al. 2007 for the study design). The survey items include measures of social support, childbearing intentions, financial circumstances, education, and the socioeconomic characteristics of the partner. For this study we selected women respondents who were living with a partner and at least one biological child under age 14 at the time of the survey. Mothers over age 45 were excluded. These selections left us with data on 3,560 women.

The dependent variable represents the childbearing intentions of the mothers studied. In the GGS, all of the respondents who were of childbearing age were asked: "Do you intend to have a(nother) child during the next three years?" In our study sample, 25.2% of the respondents said they intended to have another child during the next three years. Of this group, 49.4% were planning to have a second child and 8.4% were planning to have a third child.

The main independent variables are grandparental child care and emotional support. In the GGS, all of the respondents who had children under age 14 in the household were asked: "Do you get regular help with child care from relatives or friends or other people for whom caring for children is not a job? From whom do you get this help?" The list of possible child care providers included mother, father, mother-in-law, and father-in-law. Thus, we were able to identify four grandparent types based on sex and lineage: maternal grandmother, maternal grandfather, paternal grandmother, and paternal grandfather. To determine the level of emotional support they were receiving, the GGS respondents were asked: "Over the last 12 months, have you talked to anyone about your personal experiences and feelings? Whom have you talked to?" For this variable we were also able to identify four different grandparent types. Child care and emotional support variables were classified into two categories: 0 = did not receive help/support (including because the grandparent was not alive), and 1 = received help/support. Because the GGS lacks information about whether the respondent's mother- and father-in-law were alive at the time of the survey, respondents parents and in-laws who have been dead were included in the analyses. The descriptive results show that maternal grandmothers tend to provide the most emotional support and child care (see Table 1).

Table 1: Cross-tabulation of the frequency of mothers who received grandparental child care help and emotional support by grandparent type (%)

	MGM	MGF	PGM	PGF	Total
Received child care help					
No (including grandparent not alive)	74.0	92.6	79.4	93.7	62.3
Yes	26.0	7.4	20.6	6.3	37.7
Received emotional support					
No (including grandparent not alive)	65.7	90.7	95.4	99.0	63.2
Yes	34.3	9.3	4.6	1.0	36.8

Notes: MGM = Maternal grandmother, MGF = Maternal grandfather, PGM = Paternal grandmother, PGF = Paternal grandfather, Total = At least from one grandparent type
Child care help n = 3,472; Emotional support n = 3,560.

The data were analysed with binary logistic regression analysis and the coefficients were odds ratios. An odds ratio above one indicated a greater likelihood of the event compared to the reference category, and an odds ratio below one indicated a smaller likelihood. These logistic regression models controlled for several potentially confounding variables: mother's age, education, perceived financial situation of the family, religious denomination, number of biological children, age of the youngest child, partner's education, and country. The distributions of key variables are shown in Table 2. Since mothers' employment status, partner age, and partner employment status were not significantly associated with fertility intentions, these variables were not included in the main regression models. We illustrated our main results by calculating the predicted probabilities. Since our data were clustered by countries, we used Stata's statistical software cluster option to compute the standard errors.

Table 2: Descriptive statistics of key variables related to mother's fertility intentions (%/mean)

	France	Norway	Bulgaria	Lithuania	All countries
Age (mean)	34.4	34.9	31.5	32.0	32.8
Educational level (%)					
Lower secondary or lower	10.7	11.6	17.8	7.5	13.4
Upper or post secondary	45.2	36.5	50.4	61.5	48.6
Tertiary	44.0	51.9	31.8	30.9	38.0
Household's financial situation (%)					
Manages with difficulty or great difficulty	17.4	3.3	52.2	10.4	28.5
With some difficulty	31.2	15.2	38.8	29.5	31.0
Fairly easily	31.9	33.7	4.9	48.1	23.3
Easily or very easily	19.5	47.8	4.1	12.0	17.3
Religious denomination (%)					
None	13.5	7.0	5.0	5.1	7.0
Roman Catholic	80.2	0.0	0.4	92.8	31.3
Evangelical-Lutheran	0.0	83.2	0.0	0.2	16.9
Muslim	3.6	0.8	14.9	0.0	7.3
Orthodox	0.8	0.0	78.9	1.3	34.8
Other	2.0	9.0	0.8	0.6	2.6
Number of children (%)					
One child	33.9	28.0	47.0	48.6	41.0
Two children	66.1	72.0	53.0	51.4	59.0
Age of the youngest child (mean)	4.7	4.8	6.2	5.7	5.6
Partner's education (%)					
Lower secondary or lower	13.5	13.4	18.1	11.9	15.2
Upper or post secondary	53.3	48.1	62.4	64.4	58.1
Tertiary	33.3	38.5	19.6	23.7	26.7

Notes: France n = 661, Norway n = 724, Bulgaria = 1,551, Lithuania = 624, all countries = 3,560.

Below, we first investigated whether grandparental investment correlated with mothers' childbearing intentions (Q1). Next, we included interaction terms in the models and analysed the interactions between grandparental investment and country (Q2), and between grandparental investment and maternal socioeconomic position (measured by the mother's education and the financial situation of the household) (Q3). We presented only interaction terms that are statistically significant at least in the case of one grandparental investment variable (i.e., child care help or emotional support). Since there were no significant interactions between grandparental investment and mother's education in any of the models, these results are not shown in the tables. For Q1 to Q3, we examined whether the investment received from at least one grandparent type was associated with mothers' fertility intentions. Finally, we analysed whether the investments made by different grandparent types had different associations with mothers' childbearing intentions (Q4).

5. Results

The binary regressions for the main variables indicated that, after other factors are controlled for, mothers who were older and whose youngest child was older were less likely to report the intention to have another child. Mothers with only one child were also more likely than mothers with two children to say they intend to have another child. The level of education of the mother and her partner were both significantly and positively related to her childbearing intentions. Mothers from financially secure households were more likely report that they intend to have another child than mothers from financially insecure households. Roman Catholic, Muslim, and Orthodox Christian mothers were more likely to say they intend to have another child than the reference group "no religious denomination". Finally, mothers from France and Norway were more likely to say they plan to have another child than mothers from Bulgaria and Lithuania (Appendix Table 1).

The descriptive statistics of mothers' fertility intentions by grandparental investment indicate that in all four countries, mothers who said they received grandparental child care help or emotional support were more often to say they intend to have a second or third child than mothers who did not report receiving grandparental help or support (Appendix Table 2). In Table 3, Models 1 and 4 show the main effects, controlling for several variables for child care and emotional support, respectively. Models 2 and 5 include the interaction between grandparental investment and country, and Models 3 and 6 include the interaction between grandparental investment and the financial situation of the family.

Table 3: Association between grandparental investment and the mother's intention to have a second or third child in France, Norway, Bulgaria, and Lithuania (odds ratios of logistic regression models)

	Child care help			Emotional support		
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Received grandparental help/support						
No (ref.)	1.00	1.00	1.00	1.00	1.00	1.00
Yes	1.04	1.17*	0.95	1.25*	1.33*	1.00
Country						
France	1.00	1.00	1.00	1.00	1.00	1.00
Norway	1.18*	1.07	1.20*	1.09	0.99	1.09
Bulgaria	0.16*	0.16*	0.16*	0.16*	0.17*	0.16*
Lithuania	0.33*	0.39*	0.32*	0.33*	0.37*	0.33*
Household's financial situation						
Manages with difficulty or great difficulty (ref.)	1.00	1.00	1.00	1.00	1.00	1.00
With some difficulty	1.26	1.26	1.05	1.26	1.26	1.25
Fairly easily	1.31	1.31	1.42*	1.29	1.29	1.11
Easily or very easily	1.42*	1.42*	1.41*	1.42*	1.42*	1.13
Received grandparental help/support × country						
Help/support × France (ref.)		1.00			1.00	
Help/support × Norway		1.14*			1.19*	
Help/support × Bulgaria		0.86*			0.90*	
Help/support × Lithuania		0.58*			0.72*	
Received grandparental help/support × household's financial situation						
Help/support × manages with difficulty or great difficulty (ref.)			1.00			1.00
Help/support × with some difficulty			1.48			1.06
Help/support × fairly easily			0.82			1.51*
Help/support × easily or very easily			1.02			1.71*

Notes: Every model controls for the following variables: Mother's age, educational level, religious denomination, number of children, age of the youngest child, and partner's education.
Models 1 to 3 n = 3,472, Models 4 to 6 n = 3,560.
* $p < .05$

Overall, no statistically significant association was found between grandparental child care help and mothers' intentions to have another child (Table 3 Model 1). However, compared to France, mothers receiving grandparental care were more likely to intend to have another child in Norway but less likely in Bulgaria and Lithuania (Model 2). The household's economic situation did not interact with grandparental help (Model 3).

Mothers who were receiving grandparental emotional support were significantly more likely to indicate that they intend to have another child than those who were not receiving emotional support (predicted probabilities: 24.1% vs. 26.8%) (Table 3 Model 4). Compared to France, emotional support was more likely associated with mothers' fertility intentions in Norway and less likely associated in Bulgaria and Lithuania. Finally, emotional support was more strongly related to fertility intentions in households with a good financial situation (Model 6).

Table 4 shows the implicated results from Table 3 for the interactions between grandparental investment and mothers' fertility intentions in different countries and with different financial situations. Compared to mothers who did not receive help with child care, mothers who received grandparental child care help had stronger fertility intentions in France and Norway, but weaker intentions in Lithuania. Compared to mothers who did not receive emotional support from grandparents, mothers who received emotional support had stronger fertility intentions in France, Norway, and Bulgaria. Finally, in financially secure households mothers who received emotional support from grandparents had stronger fertility intentions than mothers who did not receive grandparental emotional support.

Next, we studied the association between investments made by different grandparent types and fertility intentions. Table 5 shows the results of eight separate models: two models (child care and emotional support) for each grandparent type. Since grandparents within the same lineage may affect each other, we control for the impact of spousal investment, in addition to other potential confounding factors.

Table 5 shows that mothers who received child care help from a maternal grandfather were significantly more likely to say they intend to have another child than those who did not receive child care help from a maternal grandfather (predicted probabilities: 25.4% vs. 29.9%). Child care help from other grandparent types was not found to be significantly associated with intentions. Mothers who received emotional support from a maternal grandmother (24.5% vs. 26.3%) and a maternal grandfather (24.9% vs. 27.9%) were more likely than other mothers to say they to intend to have another child. The emotional support received from a paternal grandmother was also found to be associated with childbearing intentions (24.8% vs. 32.3%). Only in the case of emotional support from a paternal grandfather was no significant association observed.

Table 4: The association between grandparental investment and the mother's intention to have a second or a third child by country and financial situation: Calculations based on interactions presented in Table 3 (odds ratios)

	Child care help	Emotional support
Country		
France	1.17*	1.33*
Norway	1.34*	1.59*
Bulgaria	1.01	1.20*
Lithuania	0.68*	0.96
Household's financial situation		
Manages with difficulty or great difficulty		1.00
With some difficulty		1.06
Fairly easily		1.50*
Easily or very easily		1.70*

Notes: Reference category = no help/support
* p < .05

Table 5: Association between grandparental investment and the mother's intention to have a second or third child in France, Norway, Bulgaria, and Lithuania by grandparent type (odds ratios of logistic regression models)

	Child care help				Emotional support			
	MGM	MGF	PGM	PGF	MGM	MGF	PGM	PGF
Received grandparental help/support								
No (ref.)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Yes	0.93	1.43*	1.05	1.13	1.15*	1.27*	1.81*	1.08

Notes: MGM = Maternal grandmother, MGF = Maternal grandfather, PGM = Paternal grandmother, PGF = Paternal grandfather
Every model controls for the following variables: mothers' age, educational level, religious denomination, number of children, age of the youngest child, household's financial situation, and partner's education. In addition, in the MGM's models the investment of the MGF is controlled for, and in the MGF's models the investment of the MGM is controlled for. In the PGM's models the investment of the PGF is controlled for, and in in the PGF's models the investment of the PGM is controlled for.
Child care help n = 3,472; Emotional support n = 3,560.
* p < .05

Finally, we analyse how the effects of help provided by different grandparents varied by parity. Child care help from a maternal grandfather (predicted probabilities: 49.3% vs. 58.3%), a paternal grandmother (49.2% vs. 52.7%), and a paternal grandfather (49.6% vs. 55.6%) was associated with the intention to have a second child (Appendix Table 3). Emotional support from a maternal grandfather (48.8% vs. 55.2%) was also significantly associated with the intention to have a second child (Appendix Table 4). Regarding the intention to have a third child, child care help from a maternal grandfather (8.4% vs. 10.5%) and emotional support from both a maternal (7.6% vs. 9.5%) and a paternal grandmother (7.9% vs. 15.1%) were associated with higher fertility intentions among mothers (Appendix Table 4).

6. Discussion

This study analysed the associations between grandparental investment and the reproductive intentions of mothers in four European countries with different levels of wealth, public provision of child care services, and fertility. Four questions were considered: Does grandparental investment correlate with mothers' childbearing intentions? Do these potential correlations vary by country? Do these potential correlations vary by the socioeconomic situation of a mother's family? How is the lineage and the sex of grandparents related to these associations?

The results showed that, in line with predictions derived from inclusive fitness theory (Hamilton 1964), grandparental investment was often correlated with increased childbearing intentions among mothers. However, this was not always the case, and the effect varied by country, socioeconomic situation, and kin lineage.

First, mothers who received grandparental child care help were more likely to say they intended have another child in France and Norway, but less likely to do so in Lithuania, while no significant associations were found for Bulgaria. Second, mothers who received emotional support from grandparents were more likely to say they intended to have another child in France, Norway, and Bulgaria, while there were shown no significant associations for Lithuania.

In addition, grandparental emotional support was more likely associated childbearing intentions among mothers in more financially secure households than among mothers in less financially secure households. Together, these country and household results suggest that grandparental investment may play a crucial role in fertility, especially in comparatively wealthy countries and among financially secure families. When the mother's socioeconomic situation is favourable overall, having support from grandparents may provide the "extra push" towards the decision to have another child.

To our knowledge this is the first study that has investigated the association between grandparental investment and the fertility intentions of parents. Some previous studies concerning grandparents' influence on fertility behaviour in high-fertility populations have found that the presence of paternal grandparents in particular increases a mother's probability of having another child (e.g., Leonetti, Nath, and Hemam 2007; Sear et al. 2003). In addition, previous studies from modern, low-fertility countries have shown that grandparental investment may increase the parents' probability of having a second child (e.g., Kaptjin et al. 2010; Tanskanen et al. 2014; Thomese and Liefbroer 2013).

Our results only partly confirm those of previous studies of grandparental investment and actual fertility behaviour in contemporary Europe. The country effects we found are generally in line with those reported by Aassve and colleagues (2012), although these effects did not include Bulgaria and Lithuania. Dutch studies have found that having child care help from both maternal and paternal grandparents increases parental fertility (Kaptjin et al. 2010; Thomese and Liefbroer 2013). In our data, however, only child care help from a maternal grandfather was correlated with increased fertility intentions. The possible effect of a maternal grandfather may reflect both the general importance of maternal grandparents and the growing importance of grandfathers in contemporary societies (see Sear and Coall 2011 for discussion).

Waynforth (2011) showed with UK data that perceived closeness to the maternal grandparents, but not to the paternal grandparents, increased the likelihood that mothers would have another child, while having received child care help did not increase fertility. In line with the results of that study, our findings for the four countries studied here indicated that mothers who reported receiving emotional support from a maternal grandmother and a maternal grandfather had increased fertility intentions. However, we also found that receiving emotional support from a paternal grandmother was correlated with higher fertility intentions as well. It is possible that grandparental investment influences fertility intentions differently than actual childbearing. Alternatively, for higher parities, grandparents may affect intentions more than realised behaviour.

The limitations of our study include a lack of knowledge about the proximate mechanisms beyond the grandparental effect. The reported associations may stem from underlying factors which increase both a woman's fertility intentions and the frequency and the quality of her interactions with her parents and in-laws. Furthermore, in the GGS grandparental emotional support was measured by asking whether the respondent had discussed her personal feelings and experiences with her parents and her in-laws during the previous calendar year, but it was unclear what the topics of these discussions were. Similarly, grandparental child care help was measured in the survey by asking the respondent whether she had received regular help from her parents and her in-laws during the past 12 months, but the respondent may not have accurately

reported all of the grandparental child care help she received, especially if the grandparental child care help was irregular or informal. In particular, the respondent may have understated the help with care she received from a grandmother, as she may consider it self-evident that a grandmother (and a maternal grandmother in particular) will provide child care (Hank and Buber 2009). This would also partly explain why we did not find significant associations between child care help from maternal grandmothers and the fertility intentions of mothers.

In conclusion, the present study shows that grandparents may influence mothers' reproductive intentions, and that this effect is especially strong in wealthier countries and among more financially secure households. Since it is not clear whether investments made by grandparents will lead to increased fertility, it is important to study the question of whether mothers who receive grandparental support really go on to have another child. In addition, help provided by kin other than grandparents (e.g., siblings, Aassve et al. 2012) may affect the fertility decisions of mothers. Studies that investigate the impact of various kin on women's reproductive intentions and behaviour are needed. This research should measure kin investment with several variables, since the impact may vary by the form of assistance. Finally, it would be interesting to identify which country-level characteristics (wealth, level of family benefits, or fertility rates) are most clearly associated with increased childbearing intentions.

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Appendix

Table A1: Association between grandparental investment (and other variables) and the mother's intention to have a second or third child in France, Norway, Bulgaria, and Lithuania (odds ratios of logistic regression models)

	Child care help		Emotional support	
	Minimally adjusted	Maximally adjusted	Minimally adjusted	Maximally adjusted
Age	0.85*	0.88*	0.85*	0.88*
Educational level				
Lower secondary or lower (ref.)	1.00	1.00	1.00	1.00
Upper or post secondary	1.79*	1.02	1.85*	1.05
Tertiary	3.55*	1.32*	3.67*	1.34*
Household's financial situation				
Manages with difficulty or great difficulty (ref.)	1.00	1.00	1.00	1.00
With some difficulty	1.82*	1.26	1.83*	1.26
Fairly easily	2.40*	1.31	2.39*	1.29
Easily or very easily	3.34*	1.42*	3.31*	1.42*
Religious denomination (%)				
None	1.00	1.00	1.00	1.00
Roman Catholic	1.80	2.19*	1.81	2.19*
Evangelical-Lutheran	1.96	1.18	1.86	1.18
Muslim	0.71	3.90*	0.70	3.86*
Orthodox	1.09	4.06*	1.10	4.05*
Other	2.32*	1.94	2.31*	2.01
Number of children				
One child (ref.)	1.00	1.00	1.00	1.00
Two children	0.13*	0.09*	0.13*	0.09*
Age of the youngest child	0.89*	0.91*	0.89*	0.91*

Table A1: (Continued)

	Child care help		Emotional support	
	Minimally adjusted	**Maximally adjusted**	**Minimally adjusted**	**Maximally adjusted**
Partner's education				
Lower secondary or lower (ref.)	1.00	1.00	1.00	1.00
Upper or post secondary	1.54	1.02	1.57	1.01
Tertiary	3.37*	1.54*	3.42*	1.52*
Received grandparental help/support				
No (ref.)	1.00	1.00	1.00	1.00
Yes	1.22*	1.04	1.55*	1.25*
Country				
France	1.00	1.00	1.00	1.00
Norway	0.80*	1.18*	0.75*	1.09
Bulgaria	0.32*	0.16*	0.32*	0.16*
Lithuania	0.45*	0.33*	0.44*	0.33*

Notes: The minimally adjusted models adjust only for maternal age. In the maximally adjusted models all of the covariates are adjusted. Child care help n = 3,472; Emotional support n = 3,560.
* $p < .05$

Table A2: Cross-tabulation of the frequency of mothers who intend to have a second or third child in France, Norway, Bulgaria, and Lithuania by grandparental child care help and emotional support (%)

	Received child care help			Received emotional support		
Intention to have another child	**Second child**	**Third child**	**Second or third child**	**Second child**	**Third child**	**Second or third child**
France						
No	59.8	14.9	29.9	56.2	13.7	27.2
Yes	60.9	20.0	34.1	66.7	23.6	39.8
Norway						
No	62.6	8.2	23.9	61.0	5.1	18.6
Yes	69.5	13.8	30.8	63.6	14.3	29.8
Bulgaria						
No	36.7	4.3	18.2	40.0	2.9	19.7
Yes	52.8	1.5	29.1	50.4	4.1	27.6
Lithuania						
No	46.7	7.8	25.9	43.6	6.9	23.7
Yes	46.8	6.3	28.6	51.9	9.0	32.5
All countries						
No	45.9	7.8	22.9	45.2	6.3	21.7
Yes	56.0	10.0	30.4	56.0	12.1	31.1

Notes: Child care help: France n = 661, Norway n = 665, Bulgaria n = 1,533, Lithuania n = 623, all countries n = 3,472; Emotional support: France n = 661, Norway n = 724, Bulgaria n = 1,551, Lithuania n = 624, all countries = 3,560.

Table A3: Association between grandparental investment and the mother's intention to have a second child in France, Norway, Bulgaria, and Lithuania by grandparent type (odds ratios of logistic regression models)

	Child care help				Emotional support			
	MGM	MGF	PGM	PGF	MGM	MGF	PGM	PGF
Received grandparental help/support								
No (ref.)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Yes	0.93	1.57*	1.19*	1.35*	1.04	1.38*	1.27	1.05

Notes: MGM = Maternal grandmother, MGF = Maternal grandfather, PGM = Paternal grandmother, PGF = Paternal grandfather. Every model controls for the following variables: mothers' age, educational level, religious denomination, number of children, age of the youngest child, household's financial situation, and partner's education. In addition, in the MGM's models the investment of the MGF is controlled for, and in the MGF's models the investment of the MGM is controlled for. In the PGM's models the investment of the PGF is controlled for, and in the PGF's models the investment of the PGM is controlled for. Child care help n = 1,441; Emotional support n = 1,459.
* $p < .05$

Table A4: Association between grandparental investment and the mother's intention to have a third child in France, Norway, Bulgaria, and Lithuania by grandparent type (odds ratios of logistic regression models)

	Child care help				Emotional support			
	MGM	MGF	PGM	PGF	MGM	MGF	PGM	PGF
Received grandparental help/support								
No (ref.)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Yes	0.92	1.34*	0.76	0.97	1.33*	1.14	2.41*	1.02

Notes: MGM = Maternal grandmother, MGF = Maternal grandfather, PGM = Paternal grandmother, PGF = Paternal grandfather. Every model controls for the following variables: mothers' age, educational level, religious denomination, number of children, age of the youngest child, household's financial situation, and partner's education. In addition, in the MGM's models the investment of MGF is controlled for, and in the MGF's models the investment of the MGM is controlled for. In the PGM's models the investment of the PGF is controlled for, and in the PGF's models the investment of the PGM is controlled for. Child care help n = 2,031; Emotional support n = 2,101.
* $p < .05$